

CLAIMS

1. A chromatography column comprising an enclosure (9), a first port (33), to put the enclosure (9) in communication with a tank (7) comprising chromatography resin particles having a size distributed between a minimum size and a maximum size, and a second port (35), to put the enclosure (9) in communication with a pump (5), wherein the first port (33) forms a passage having a minimum section which is at least 10 000 times as large as a particle section corresponding to the maximum size particles.

2. The chromatography column of claim 1, wherein the enclosure (9), when in use, extends vertically between a bottom (11) and a top (13), the second port (35) being located above the first port (33).

3. The chromatography column of any of the preceding claims, wherein the first port (33) is provided with an inlet valve (39) having a minimum section which is at least 10 000 times as large as the particle section corresponding to the maximum size particles.

4. A chromatography column comprising:  
- an enclosure (9),  
- a first port (33) provided with an inlet valve (39), to put the enclosure (9) in communication with a tank (7) comprising chromatography resin particles having a size distributed between a minimum size and a maximum size, and  
- a second port (35), to put the enclosure (9) in communication with a pump (5),  
wherein the inlet valve (39) comprises a chamber (41), an inlet duct (43) and a piston (45),  
- the chamber (41) communicating with the enclosure

(9) through a first aperture (47),

- the inlet duct (43) communicating with the chamber (41) through a second aperture (49) and being adapted to be connected to the tank (7), and

5       - the piston(45) being movable in the chamber (41) between a closing position, where it closes the first (47) and second (49) apertures, and an opening position, where it opens the first (47) and second (49) apertures, said piston (45) letting free substantially all the space of the  
10 chamber (41) between the first (47) and second (49) apertures.

5. The chromatography column of claim 4, wherein the enclosure (9), when in use, extends vertically between  
15 a bottom (11) and a top (13), the second port (35) being located above the first port (33).

6. The chromatography column of claim 4 or claim 5, wherein the valve (39) defines a passage between a pipe  
20 (51) adapted to be connected to the duct (43) and the enclosure (9), said passage having a minimum section which corresponds to the section of any of the first (47) and second (49) apertures.

25       7. The chromatography column of claim 6, wherein the minimum section of the passage is at least 10 000 times as large as the particle section corresponding to the maximum size particles.

30       8. The chromatography column according to any of claims 4 to 7, wherein the piston (45) when in closing position has an end surface (53) with a tapered shape, said end surface having a portion which is flush with the internal surface of the enclosure (9).

9. The chromatography column of any of the preceding claims, wherein the first port (33) forms a passage having a minimum section corresponding to at least a minimum internal diameter of 20 mm.

5

10. A module for loading a chromatography resin into a chromatography column (3) according to any of the preceding claims, said module (1) comprising said chromatography column (3) and a pump (5) connected to the second port (35) through a pipe (40).

10

11. The module according to claim 10, further comprising a tank (7) for chromatography resin, said tank (7) being connected to the first port (33).

15

12. A method for loading a chromatography resin into a chromatography column (3) comprising an enclosure (9), a first port (33), to put the enclosure (9) in communication with a tank (7) comprising chromatography resin particles having a size distributed between a minimum size and a maximum size, and a second port (35), to put the enclosure (9) in communication with a pump (5), wherein the first port (33) forms a passage having a minimum section which is at least 10 000 times as large as a particle section corresponding to the maximum size particles.

20

25

13. A method according to claim 12, wherein said column (3) comprises an enclosure (9) having a first port (33) and a second port (35), and said method comprising pumping a dry chromatography resin from a resin tank (7) into the enclosure (9) through the first port (33), via a pump (5) connected to a second port (35).

30

35

14. The method of claim 12 or claim 13, wherein the

vacuum pressure in the enclosure is between -100 kPa and -50 kPa.

15        15. The method according to any of claim 12 to claim 14, wherein the enclosure (9), when in use, extends vertically between a bottom (19) and a top (13), the second part (35) being located above the first port (33).

10        16. A method for unloading a chromatography resin mixed with a liquid, from a chromatography column (3) into a chromatography column (3) comprising an enclosure (9), a first port (33), to put the enclosure (9) in communication with a tank (7) comprising chromatography resin particles having a size distributed between a minimum size and a maximum size, and a second port (35), to put the enclosure (9) in communication with a pump (5),  
15        wherein the first port (33) forms a passage having a minimum section which is at least 10 000 times as large as a particle section corresponding to the maximum size  
20        particles.

25        17. The method of claim 16, wherein said column comprises an enclosure (9) having a high port (35) located above a low port (33 or 37), this method comprising successively the steps of

- a) pumping the liquid from the enclosure through the low port (33 or 37),
- b) drying the chromatography resin comprised in the enclosure (9), and
- 30        - c) pumping the dried resin through the low part (33 or 37).

35        18. The method according to any of claims 16 and 17, wherein the vacuum pressure in the enclosure (9) is between -100 kPa and -50 kPa.

19. The method according to any of claims 17 and 18, further comprising between steps b) and c) injecting a gas through the low port (33 or 37).

5

20. The method according to any of claims 17 to 19; in which step b) comprises injecting a hot gas through the high port (35).